Earth & Environmental Sciences Division

News, Views & EEScience

Safety

A Message from Jeff

Jeff Hansen, Division ES&H Officer,
667-5043, jchansen@lanl.gov

Suspect Counterfeit Item Alert!!

We have been notified that a suspect/counterfeit item (S/CI) may be in use at Los Alamos. The item is a 1/2 inch ball valve labeled Apollo Corp., carbon steel, Conbracko Industries, #100WOG. Some of these valves were found to have counterfeit bolts installed. Those of you in EES Division involved in equipment fabrication, please take note of this. If you find any of these, call Jeff Hansen at 7-5043. Please let me know if you have any before December 8, 2003. I don't expect that this is a big item in our work right now.

Integrated Work Management – Interim Process

By now many of you have heard that there is a new mountain of paperwork required to do our work. Several meetings have been held on short notice and no small amount of anxiety has been developing. Let me try to explain what is happening and what we can expect in the short term.

The Integrated Work Document (IWD) process is not replacing the current Hazard Control Process (HCP) system. The new IWD is being prepared as an amplification to our normal HCPs and has a primary feature of clear responsibly for the work, what the risks of the tasks are, and who will be expected to do them. It will ensure that employees have input to the work development as well as taking part in a walk-down of the job. These things were found to be lacking in the work control documents related to several high profile accidents here in the last 1-2 years. The Director has insisted that Los Alamos change the current processes (as many as five different work control systems) and to develop only one general approach to work control and this is the beginning. A policy change notice (Notice 0131) was issued to start this process and a directive to make changes to our existing documents, in our case HCPs, with a completion date of January1, 2004. For EES Division, this will include about 37 Hazard Control Plans. There is a web page that has the current information on the IWD process http://int.lanl.gov/safety/iwmc/. There is special emphasis on work related to excavations, penetrations, hoisting, rigging, and facility dismantlement.

We are requested to develop a job hazard analysis for each specific HCP and have the proper signatures and participation to make sure the workers, managers and subject matter experts are aware of the hazards of the specific job and agree that this is what we want done.

Some of the issues we are having: This process is not real friendly for long term or generic HCPs or fieldwork with various people in charge. In spite of this, some of our early examples are proving to be easier than anticipated. We will have more on this subject in the next few newsletters. As always if you have a question please contact Jeff Hansen.

Security

An Ear on the LIR from Tony

Tony Montoya, Acting Division Security Officer (DSO), 7-8065, antonio@lanl.gov

Escort Changes

The requirements of Classified Security LIR Attachment 18 (Escorting US Citizens in Security Areas, http://lln.lanl.gov/lir/lir4060002att18.pdf) became effective on Nov. 3, 2003. The requirements include maintenance of a log by which uncleared individuals (be they Laboratory workers or visitors) must be logged. You should all have received the new Procedures and Requirements for escorting uncleared U.S. citizens into security areas. Form 1812 is not longer required and PTLA guards are no longer responsible for keeping logs. The rules in EES Division require you to seek permission from the Division office (Terry Wallace and Craig Pearson) before escorting. The logs are very important and will be one of the areas that DOE will audit us on. It is best not to fill in the log ahead of time. The log itself is located at: http://int.lanl.gov/security/personnel/escort/sm43/

PTLA Staffing

Recently, Director Nanos approved changes in the configuration of some access control posts currently staffed by Protection Technology Los Alamos (PTLA). The changes became effective as of November 10, 2003. Most of the changes involve a reduction in operating hours, a difference in the type of Protective Force (PF) officer staffing the post, or - in some cases, the elimination of PF staffing altogether. Here is a recap of the changes that will be most noticed

by workers located in the area of the affected Posts:

Post 412 - Main entrance to TA-3-43, next to old badge office: Position eliminated. Access will be accomplished through the existing turnstile and handicapped door. For SM-43 escorting issues please see the November 3 Newsbulletin article:

http://www.lanl.gov/orgs/pa/newsbulletin/2003/11/03/text05.shtml.

Post 324 - TA-3-43 X-Division Exclusion Area: Hours of operation reduced to 11 hours a day/5 days a week from 24 hours a day/7 days a week.

Post 327 - West side of SCC: Position eliminated. Access control activities or requests will be transferred to interior SCC Posts 325 and 326.

Organizational News

Yvette Manzanares accepted the Administrative Specialist-3 position in the Division Office. Yvette will provide administrative support to Craig Pearson and DO staff. Yvette began her new position on November 10 and she brings valuable experience from her previous positions in several division and group offices during her eleven years at Los Alamos. Yvette was awarded a BS degree in Business Administration in 2001 and she also possesses a Master's Certificate in Project Management.Welcome, Yvette!

EES-9 has New Name

The Environmental Geology and Risk Analysis Group (EES-9) is now the Environmental Geology and Spatial Analysis Group.

EES Student Ombud News

Alexis Lavine, Student Ombudsman
667-3605, alavine@lanl.gov

Alexis Lavine will begin serving as a member of the Student Programs Advisory Committee (SPAC) on January 1, 2004. SPAC serves as an advocate for the quality of each student's experience at LANL, monitors the quality and impact of student programs to ensure effective communication about student programs, and recommends policy changes and initiatives for improvement in student programs.

New EES Postdoctoral Representative

W. Scott Baldridge, EES-11, will assume the duties of Don Hickmott, EES-6, as the new EES Postdoctoral Representative. "Scott" has worked at Los Alamos for 25 years and his contributions are diverse and represent a variety of basic and applied projects, including Basic Energy Sciences-sponsored volcanology research, Environmental Restoration, and Yucca Mountain. He is the Co-Director of the Summer of Applied Geophysical Experience (SAGE) for the past 16 years. The technical disciplines that Scott represents are petrology, geochemistry, isotopics, structural geology, and tectonics. Scott can be reached at 7-4338 and his e-mail is sbaldridge@lanl.gov.

We wish to thank Don Hickmott for his service on the "Postdoc Committee." His guidance and contribution brought great visibility to EES science. EES benefited in hiring many postdocs due to Don's assistance - Thanks, Don!

- A Rock Solid Message from Terry Wallace

The United Way: LANL and the Northern New Mexico Community

The 2004 United Way campaign is coming to a close, and I think it is appropriate to review the results. It is fair to say that the United Way campaign is polarizing in the work place: there are a number of people that feel that management unfairly badger employees to contribute to charities. I certainly understand this concern, and I truly believe that charity is in the heart and should not be coerced. However, I am very aware that United Way makes a tremendous difference in our community. Literally tens of thousands of Northern New Mexicans are served by United Way charities. I think it is best to take a step back and look at some specific examples.

Jim Aldrich (EES-6) is the President of the Habitat for Humanity of the Española Valley and Los Alamos. I asked him to tell his story:

The United Way campaign provides critical funds for its member agencies. As the current president of Habitat for Humanity of the Española Valley and Los Alamos, Inc. I can attest to just how important the funds are to our Habitat affiliate.

Habitat for Humanity renovates substandard houses and builds houses with partner families for people in need. Partner families are selected through an extremely thorough review process. One key requirement is that a family's income must be less than one half of the median income for what HUD refers to as a metropolitan statistical area or MSA. Rio Arriba County is one such area. Santa Fe and Los Alamos counties are combined into a single MSA. Each family must, of course, be in

need of decent housing and they must be willing to partner with Habitat for Humanity by performing what is referred to as "sweat equity." Usually families perform sweat equity by assisting with the building project/renovation of their own house as well as the houses of other Habitat partner families. The mortgages (for the cost of the building materials) provided to the families are interest free. The construction work is done by volunteers.

To give you an idea of the impact Habitat for Humanity has I will mention two renovation projects recently completed by the affiliate. **In Rio Arriba County (Velarde) we renovated the bathroom of an elderly couple who were no longer able to bathe themselves because the could not get in and out of their bath tub**. Our Habitat affiliate renovated their bathroom - widening the doorway for wheelchair access, removing the tub and installing a shower, and installed grab bars in the bathroom in the shower and the hallway so they could get around. They have been deeply grateful to be able to continue to stay in their own home and take care of themselves.

The other project we did was in Los Alamos - for a secretary who works at the Laboratory. She, and one of her sons, have severe medical problems - so much so that they are often in the hospital. The Laboratory medical policy does not begin to cover her medical expenses and so she works at the hospital on weekends and as a waitress at a local restaurant at night trying to make ends meet. She is extremely conscientious about paying her bills. About two years ago she was in an automobile accident, that was not her fault, and she received an award for her injuries. She wanted to use the money to have her house modified so that her son who needs to use a wheelchair would be better able to get around the house. Her next door neighbor informed that her "boyfriend" was a carpenter and that he could do the work much more cheaply for her than a contractor. So she hired the "boyfriend" to remodel her house. The fellow took out windows, removed doors and a large section of a wall and put in the foundation for an addition. He then asked her for the rest of the money so that he could finish the job. She gave him the money and he left town. That was in October of last year when the cold weather was beginning to settling in.

Our affiliate was able to quickly process her application to partner with us. We got her home fully enclosed before the winter and waited until the warmer weather returned this year to do the stuccoing. She has been incredibly grateful for Habitat's help.

If you were to experience the gratitude of these two families I am sure that you too would be as deeply moved as I have been.

Something that you may not be aware of is that each member agency of the United Way has to prepare a detailed proposal of the need for their services and justify their costs. The proposal for our affiliate was about a quarter of an inch thick this year to give you some idea of the explanations and documentation we have to provide the United Way. The proposal included an audit of the affiliate's financial records. I would add here that our financial records are open to the public as is everything we do.

I would thank each of you who has already given to the United Way campaign this year and would encourage those of you who haven't given yet to please consider doing so.

Jim Aldrich

President, Habitat for Humanity of the Española Valley and Los Alamos

At the time of this new letter 30 percent of the Laboratory where participating in United Way 2004 – this is far below the target of

42 percent participation. EES is similar to the Laboratory as a whole.

Dollar$ and $ense New$

We are in the process of submitting final proposals for LDRD-DRs! I will have more on the fiscal issues in my December update; however, I encourage you to read the SELT's update on the LDRD pre-proposals in this Newsletter.

Service Anniversaries & Congratulations to the Following

Steen Rasmussen, **EES-6, 15 years**

Marja Springer, **EES-6, 20 years**

News from the Science and Engineering Leadership Team

Jeff Heikoop, Chair,
7-8128, jheikoop@lanl.gov

The SELT has been actively engaged in the LDRD process during the month of November. During a Division Leadership Team meeting with David Watkins of the LDRD office, SELT presented a list of suggestions for improvements in the upcoming LDRD-DR process. We have also solicited LDRD-DR quad charts from EES Division. An LDRD-DR forum was held on November 17th during which six LDRD ideas were presented by PIs and the SELT and other attendees provided constructive feedback. We received advice from members of the DLT, former SELT members, and PIs who have had success in the LDRD-DR process in the past. Two page pre-proposals are due to SELT by December 4th and we encourage those who have not yet participated in the process to join in. SELT will provide comments on pre-proposals before the Christmas holidays so that PIs can make revisions in the new year before proposals are sent the Division Office. SELT has also offered to help draft EES Division's contribution to the LDRD-DR White Paper that sets priorities for LDRD-DR research. In addition, we will be hosting Howard Hanson on December 1st to discuss the LDRD-ER process, including the question of, "How EES can improve its success in this important funding venue?"

During November, SELT met with the five Division Leader Candidates and provided feedback to the search committee and to Tom Meyer, ADSR. SELT also met with David Janecky to discuss opportunities in Basic Energy Sciences. We will send out a summary of that meeting shortly. Our December activities will focus on the LDRD-DR process, though we will also plan an LDRD-ER forum for early next year.

Weekly Highlights / Accomplishments sent to ADSR

Los Alamos Participates in NEON

The Savannah River Site hosted the first of three National Ecological Observatory Network - Southeast (NEON-SE) meetings on October 15-18. The meeting focus was to develop a proposal to the National Science Foundation for funding of the entire NEON program that was estimated at $350M if congress approves the budget; the bill is currently in committee.

Earth & Environmental Sciences Division

Dr. Daniel Cooper of the Earth and Environmental Sciences Division attended the first meeting where the kinds of questions, site development, and participants were discussed if NEON-SE is to be funded. A write-up of the science directions for this NEON site will be posted on a web site within several weeks.

Dr. Cooper presented Los Alamos' lidar applications for inclusion in the proposal and this will include spatially resolved scalars and fluxes that are now part of lidar's surface-atmosphere component and a high-resolution modeling component. Dr. Cooper was invited back for the second meeting on instrumentation for NEON, where he will introduce Los Alamos' Laser-Induced Breakdown Spectroscopy system as well as the lidars.

From this interaction, Los Alamos has a good chance of being included in the NEON-SE funding. In addition, two participants: Robert Mitchell of the Joseph Jones Ecological Research Center and Michael Binford of the University of Florida wish to form a consortium of universities to help get the lidar to their field site for a demonstration program. They also feel that having a carbon dioxide measurement lidar is of great importance and would view its development in a positive light.

Los Alamos Briefs Air Force on Tunnel Target Defeat

On October 21, 2003, Wendee Brunish, of the Earth and Environmental Sciences (EES) Division, and Earl Knight, Decision Analysis Division, briefed visiting Air Force Lt. Col. Hilton of the Air Force's Global Persistent Attack program on the Tunnel Target Defeat Advanced Concept Technology Development activities at Los Alamos. Brunish briefed the visitor on the EES's developed Geologic Assessment Methodology for Underground Targets, which produces three-dimensional geologic models for targets of interest with limited data sets. On October 22, 2003, Brunish, and Knight, hosted Defense Threat Reduction Agency visitors, Mike Giltrud, Lt. Col. Tom Ward, Kent Goering (Advanced Research Applications) and George Slyer, (Northrup Grumman International Technologies). The visitors are sponsoring the Tunnel Target Defeat Advanced Concept Technology Development activities at Los Alamos and were briefed on our program direction and progress to date. The visitors were also briefed on EES's developed Geologic Assessment Methodology for Underground Targets.

Interagency Geotechnical Assessment Team Workshop in Washington

Ward Hawkins of the Earth & Environmental Sciences Division participated in the Defense Threat Reduction Agency's, Interagency Geotechnical Assessment Team (IGAT) workshop on October 14 - 17, 2003 held in Alexandria, VA. The IGAT provides support to STRATCOM and others in the form of site-specific and regional geological characterizations. Hawkins is a member of the IGAT steering committee.

Los Alamos' ARM Dedicates Climate Change Kiosk to North Slope Alaska

The Atmospheric Radiation Monitoring (ARM) Education and Outreach team in the Los Alamos' Earth and Environmental Sciences Division returned from a successful trip to the North Slope of Alaska (NSA) in October. The team was led by Dr. Michael Ebinger, Acting Group Leader of the Atmospheric, Climate, and Environmental Dynamics Group and the Director of ARM Education and Outreach, and staffed by Marja Springer, and students Margo Bachman, Janet Lynch, Andrea Maestas, Tina Sommer, and Carrie Talus. The main purpose of the trip was to dedicate the new interactive kiosk titled, "Climate Change: Science and Traditional Knowledge," now on permanent display at the Iñupiat Heritage Center (IHC) in

Barrow, Alaska. The kiosk is a unique opportunity for people to learn about the effects of climate change from an Iñupiat and a scientific perspective. The final product evolved through partnerships with many in the community in Barrow, including elders, whalers, scientists, and educators.

Yucca Mountain Tours Nuclear Waste Officials, Dartmouth, FEMA, and Japan

On October 27 and 28 Dick Kovach, Earth and Environmental Sciences Division's Yucca Mountain Project, toured representatives of White Pine County Nuclear Waste, a delegation from the Japanese Federation of Electric Power Companies, John Summers, Reporter for KLAS-TV Channel 8, Las Vegas, NV, the Regional Assistance Committee-Advisory Council (RAC-AC), Kenneth Chin, Chairman, RAC-AC for Radiological Emergency Programs/Dept. of Homeland Security and Emergency Preparedness and 26 members who are associated with FEMA (Federal Emergency Management Agency).

Bruce Reinert and Dick Kovach also toured the Wise Women Club, Dartmouth College's Associate Professor of Earth Science, Leslie Sonder, and 20 students from Dartmouth on October 29.

Tours were conducted on November 4 and 5 for Clark County, Nevada School District representatives and 40 individuals from Sun City Summerlin, Nevada. Reinert and Kovach conducted underground tours for 250 individuals supporting the "fall "Open House" at Yucca Mountain.

Los Alamos Holds Valles Caldera Workshop

A workshop on lacustrine sediments, climate change models, and possible scientific drilling in the Valles caldera, New Mexico was held on October 22 and 23, 2003 in Los Alamos, NM. The Institute of Geophysics and Planetary Physics (IGPP) and the Earth and Environmental Sciences Division of Los Alamos National Laboratory sponsored the workshop. About 60 scientists from New Mexico and other locations within the United States attended the workshop to weigh the pros and cons of climate change studies at Valles.

The 22-km-diameter Valles caldera (c.a.1.2 Ma) is the world's type resurgent caldera and is host to a 280°C liquid-dominated hydrothermal system (Smith and Bailey, 1968; Goff and Gardner, 1994). The caldera also contains various lacustrine sediments and hydromagmatic deposits dating from the inception of caldera formation to roughly 50 ka. More recent bog deposits are also present. Many of these deposits are presumably buried within the caldera moat, and overlain and interbedded with post-caldera moat rhyolite eruptions. New geologic mapping at 1:24,000 scale shows that the best exposures of lacustrine rocks occur on the uplifted flanks of the central resurgent dome and as eroded remnants within the encircling valleys (Valle Grande, Valle Toledo, Valle San Antonio).

Contact: Fraser Goff, Jeffrey M. Heikoop, Giday WoldeGabriel, and Julianna Fessenden-Rahn; EES-6, MS D462, Los Alamos National Laboratory, New Mexico 87545

fraser@lanl.gov,3 jheikoop@lanl.gov, wgiday@lanl.gov, and fessende@lanl.gov

Los Alamos Hosts GIS Open House

On November 19, 2003, Los Alamos will be holding a Geographic Information Systems (GIS) Day open house on the second floor of the Study Center at Los Alamos National Laboratory from 9:00 AM to 4:30 PM. All U.S. citizens and foreign nationals with a Los Alamos badge are invited to attend.

Los Alamos' GIS Day open house will include an array of presentations, posters, demonstra-

tions, and discussions to highlight how GIS is used in a range of Laboratory applications. GIS has significant and widespread uses in a number of existing programs and can be a major capability in new and developing programs. **For example, the emergency operations team used GIS extensively during the 2000 Cerro Grande Fire to track the fire's movement.** After the fire, analysts used GIS to analyze flooding and erosion risks and map the extent of fire damage.

ZECA – Returning to Nature What Nature Gave Us

The December 2003 issue of Scientific American features research led by Hans-Joachim-Ziock of Los Alamos National Laboratory's Earth and Environmental Sciences Division and done in collaboration with team members Los Alamos' Materials Science and Technology, Chemistry, Engineering Sciences and Application, and Theoretical divisions. The research has resulted in development of a process that converts coal into hydrogen and subsequently electricity. To further the application of the Zero Emission process, Los Alamos researchers, in collaboration with a consortium of energy companies and research institutes, formed the non-profit Zero Emission Coal Alliance (ZECA) in 1999. The for-profit ZECA Corporation recently replaced the Alliance in 2001 and is now working on the design for a pilot plant that will produce electricity at efficiency levels of approximately 70 percent (twice that of current coal-fired plants). At the same time, the pilot plant will capture all of carbon dioxide produced has and provide zero emission of any pollutants to the atmosphere.

The process for zero emission coal would convert coal into methane, which in turn is reformed into hydrogen and calcium carbonate; the hydrogen goes to a fuel cell that generates electricity and the calcium carbonate is broken down into calcium oxide and carbon dioxide. The carbon dioxide gas could then be incorporated into a mineral (magnesium carbonate) and disposed of underground - returning the carbon to the solid earth and minimizing carbon dioxide loading of the atmosphere.

Texas Officials, NEI, and US Air Force Representatives Tour YMP

Tours were conducted on November 10 and 13 by Bruce Reinert of the Earth and Environmental Sciences Division's Yucca Mountain Project (YMP) for officials from the South Texas Project Legislators, Texas Emergency Management and Highway Patrol, Texas Department of Public Safety, the Nuclear Energy Institute (a lobby group for the nuclear industry), and officials from the United States Air Force Security Special Program Oversight and Policy Programs.

The briefing included traveling about 2,700 meters underground to observe a test where electric heaters simulate canisters that are heating up the rock to provide scientists with information on how this heating affects the geology of the repository.

Los Alamos Develops New Theory for Mixing and Reactive Transport in Porous Media

Bruce Robinson and Hari Viswanathan in the Earth and Environmental Sciences Division have **adapted and extended the theory of micromixing**, first introduced in the chemical reaction engineering literature, to the topic of reactive transport in groundwater (Robinson, B. A., and H. S. Viswanathan. Application of the theory of micromixing to groundwater reactive transport models, Water Resour. Res., 39(11), 1313, doi:10.1029/2003WR002368, 2003).

For all but the simplest linear kinetic and sorption models, the fate and transport of a reactive solute depends not only on the residence

times of reacting molecules in the system, but also on micromixing, defined loosely as the small-scale mixing processes that brings reacting molecules into close proximity. Robinson and Viswanathan showed that local concentration variations, which are invariably averaged out in large-scale numerical models, and are nearly impossible to measure, matter significantly for some groundwater reactive transport systems. The theory developed demonstrates this concept, and provides a means for bounding the impact of micromixing on reaction in groundwater. The work provides a straightforward and practical way to investigate the importance of a phenomenon for which data are seldom available and whose impact on groundwater reactive transport models has heretofore not been studied in a systematic, bounding manner. The approach is general, and therefore may also find applications in other fields, including carbon dioxide sequestration, atmospheric chemical fate and transport, and chemical reactor theory.

A University of California scientist working at Los Alamos National Laboratory in collaboration with researchers from the U.S. Geological Survey, New Mexico Institute of Mining and Technology, the University of Nevada, the University of Arkansas and Desert Research Institute in Reno, Nevada, has recently found evidence that there may be significantly more amounts of nitrogen, in the form of nitrates, than previously estimated in desert landscapes. The discovery of these vast subsoil nitrate reservoirs could have implications for groundwater quality in arid/semi-arid environments worldwide, as mobilization of the nitrates could adversely affect drinking water supplies.

According to Brent Newman, a scientist in the Earth and Environmental Sciences Division at Los Alamos, **"this discovery could have some significant implications for humankind**. The discovery of the subsoil nitrate reservoirs could raise previous estimates of nitrogen soil and subsoil inventories by as much as 71 percent in warm deserts and arid shrub lands and up to 16 percent in global nitrogen totals. These large nitrate inventories could adversely affect water quality if the nitrate becomes mobilized by land use change, such as conversion of natural deserts and scrublands to irrigated agriculture, or by wetter climatic conditions. Nitrate also is an important nutrient and the finding of large nitrate inventories in the subsoil has important implications for understanding nutrient cycling in arid and semiarid ecosystems around the world."

In findings published in the November 7 issue of the journal Science, the team of scientists theorize that the nitrate reservoirs have been accumulating in subsoil zones of arid regions throughout the world over the last 11,000 years, during a period of geologic time called the Holocene Epoch, when the onset of arid Holocene climatic conditions and succession to vegetation requiring scant amounts of moisture triggered subsoil nitrogen retention.

http://www.lanl.gov/worldview/news/releases/archive/03-148.shtml

Yucca Mountain Tours NRC and ACNW

The Associate Director, Sher Bahadur, of the Nuclear Regulatory Commission (NRC) and members of the Advisory Committee on Nuclear Waste, the NRC, officials from Amargosa and Clark Counties, Nuclear Waste Projects Office, and the Nuclear Waste Task Force received a tour on November 18 of the Yucca Mountain Project. Dick Kovach and others from the Earth and Environmental Sciences Division conducted the representatives to several locations underground and discussions included an overview of the geology, the results of testing activities, the repository layout, and the stability of excavations.

Yucca Mountain Celebrates Star Status Under OSHA

The Yucca Mountain Project celebrated their attainment of Star Status (VPP) under the Occupational Safety Health Administration's Voluntary Protection Program On November 20. The Geotechnical Engineering and Research Group (EES-7) in the Earth and Environmental Sciences Division coordinates and integrates testing activities at the Yucca Mountain Project, which is only one of 19 DOE sites that have been awarded this honor. The presentation was made at a breakfast for the staff and craft located in Area 25 of the Nevada Test Site (NTS). In Las Vegas, Nevada, the celebration was held at a local park with lunch provided. **This award makes the YMP project one of two organizations in Nevada that have attainted VPP Star Status**. The other is Wackenhut Services, Inc., that provides security for the NTS.

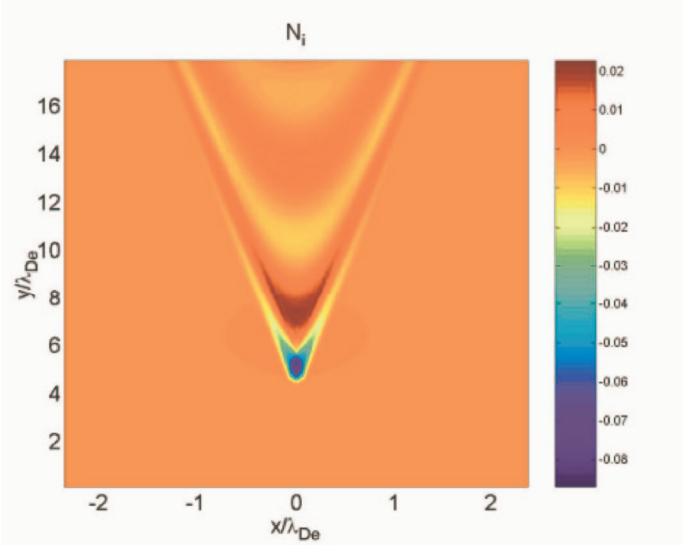
Los Alamos Participates in AFTAC Knowledge Base Delivery

The Air Force Tactical Air Command (AFTAC) is charged with monitoring nuclear testing worldwide and Los Alamos scientists in the Geophysics Group in the Earth and Environmental Sciences Division play an important role in developing the knowledge and techniques that allows AFTAC to accomplish its mission. AFTAC operates and maintains the current United States Atomic Energy Detection System (USAEDS) and installs additional seismic arrays to support national objectives. During the week of November 17, Los Alamos researchers participated in Knowledge Base Delivery 6.1 to AFTAC. The products included calibration and research products for stations of the USAEDS network that will improve Detection, Location, Event Identification, and Yield Estimation capabilities.

Mystery Image Winner for October:

1st Place: Debbie Pirkl, EES-DO

(It would appear that Debbie is an avid reader of the **Progress Report**!)



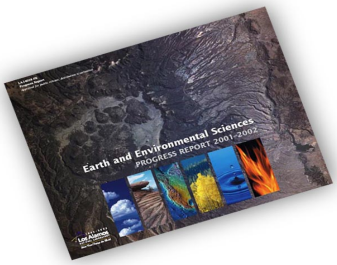
This was an example of a trail left behind by a small object such as a meteor. See technical abstract below.

How's the Weather in Space?

According to Gary Geernaert, EES-IGPP and Joachim Birn, NIS-1, "The space environment of the Earth is populated with electrically charged particles (plasma) whose motions are controlled by the geomagnetic field and driven by energy extracted from the solar wind, the supersonically expanding solar atmosphere. "This image is an example

of a trail left behind by a small object such as a meteor falling in the atmosphere, as obtained from a plasma simulation.

Learn more about the objectives of our Los Alamos comprehensive efforts to characterize and understand the mechanisms that govern space weather, including the propagation of solar disturbances and their interaction with the terrestrial magnetosphere, ionosphere, and the atmosphere: EES Progress Report, 2001 - 2002, page 83.



Dottie's Mystery Image for November:

- Is this Redondo Peak in the Jemez?
- Is this Cerro Pelado in the Jemez?
- Is this Valle Toledo in the Jemez?

Respond to: dot@lanl.gov

EEScience

Guest Editorial

Valles Caldera Workshop October 22 - 23

Fraser Goff,
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Summary

A workshop on lacustrine sediments, climate change models, and possible scientific drilling in the Valles caldera, New Mexico was held on

October 22 and 23, 2003 in Los Alamos, NM. The workshop was sponsored by the Institute of Geophysics and Planetary Physics (IGPP) and the Earth and Environmental Sciences Division of Los Alamos National Laboratory. About 60 scientists from New Mexico and other locations within the United States attended the workshop to weigh the pros and cons of climate change studies at Valles.

Photo Above:
Photo looking north of workshop with participants walking to a well-exposed lacustrine section in Valle San Antonio, Valles caldera. Ridge in background is the north caldera wall. Lacustrine sediments in this area overlie rhyolite lava dated at 0.8 Ma, have normal magnetic polarity, and contain diverse diatom fauna at different stratigraphic levels (photo by F. Goff, EES-6).

The 22-km-diameter Valles caldera (c.a.1.2 Ma) is the world's type resurgent caldera and is host to a 280°C liquid-dominated hydrothermal system (Smith and Bailey, 1968; Goff and Gardner, 1994). The caldera also contains various lacustrine sediments and hydromagmatic deposits dating from the inception of caldera formation to roughly 50 ka. More recent bog deposits are also present. Many of these deposits are presumably buried within the caldera moat, and overlain and interbedded with post-caldera moat rhyolite eruptions. New geologic mapping at 1:24,000 scale shows that the best exposures of lacustrine rocks occur on the uplifted flanks of the central resurgent dome and as eroded remnants within the encircling valleys (Valle Grande, Valle Toledo, Valle San Antonio).

Very few absolute ages exist for these lacustrine deposits but **geologic constraints indicate that a large lake formed in the caldera immediately after it's creation and that several lakes existed in the valleys after 0.8 Ma. (See Lakes photo at end of editorial).**

A pollen study on shallow core and cuttings from a water well drilled in Valle Grande shows pronounced cycles of "dry" to "wet" pollen ratios (Sears and Clisby, 1952). Presumably, the sediments of this study represent the youngest lacustrine deposits. Although nearly forgotten, this study suggests that the caldera sediments may contain a significant climate record and indicates that the Valles record correlates with a climate record as far away as Mexico City.

The first day of the workshop consisted of a series of talks on Valles geology, lacustrine

deposits, soils, and geophysics; global and regional climate change models, climate change studies using lacustrine records; and a variety of studies from other lacustrine sequences. **The second day consisted of a field trip into the Valles caldera to examine exposed lacustrine rocks** in the moat zone and a post field trip meeting to decide what to do next. Although no consensus was reached, most participants wanted a preliminary exploratory scoping corehole drilled in Valle Grande to penetrate the youngest lacustrine sequences and to investigate their climate record using pollen, paleomagnetic, isotope, dating, and other investigative techniques. Most participants felt that shallow seismic surveys were necessary in Valle Grande to determine the thickness and structure of the moat sediments, the position of possible buried volcanic domes, the absolute position of the buried ring-fracture zone, and the most suitable drilling site(s) for shallow and deep coring. Participants felt that successful results from the scoping hole would justify additional and deeper holes for further climate research at Valles.

Photo of Lakes Evidence:
A large lake formed immediately after Valles caldera was created (Goff and Gardner, 1994). Evidence for the lake includes fine-grained, well-bedded deposits of mud and silt

For additional information on the workshop, participants, and/or Valles lacustrine deposits, contact the workshop organizers listed above.

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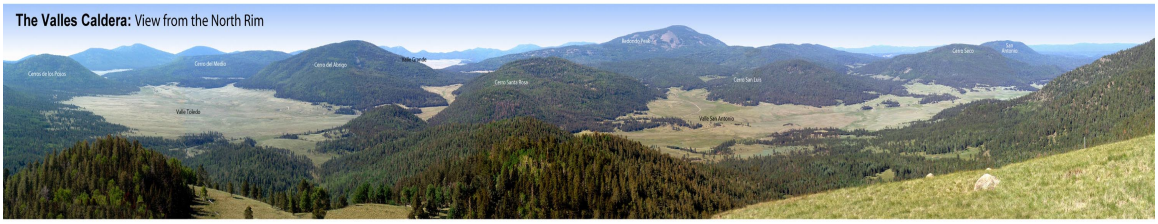

Photo above:
Panorama of the Valles Caldera, courtesy of Kirt Kempter.

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